ABSTRACT

A plasma chamber apparatus and method employing a magnet system to block the plasma within the chamber interior from reaching the exhaust pump. An exhaust channel between the chamber interior and the pump includes a magnet and at least one deflector that creates turbulence in the flow of exhaust gases. The magnetic field and the turbulence produced by the deflector both increase the rate of recombination of charged particles in the gases, thereby reducing the concentration of charged particles sufficiently to quench the plasma downstream of the magnet and deflector, thereby preventing the plasma body within the chamber from reaching the exhaust pump. The plasma confinement effect of the magnetic field permits the use of a wider and/or less sinuous exhaust channel than would be required to block the plasma without the magnetic field. Therefore, the pressure drop across the exhaust channel can be reduced in comparison with prior art designs that rely entirely on the sinuousness of the exhaust channel to block the plasma. Alternatively, if the magnetic field is strong enough, the magnetic field alone can block the plasma from reaching the exhaust pump without the need for any deflector in the exhaust channel.